	Standard Operation Procedure	Document No:
		Revision:
	S1800 Series Photoresist Spin Curve	Author: Mohsen Azadi, Gerald Lopez

## Goal:

This report documents the spin curves for MicroChem S1805, S1813, S1818 series resist.

## Materials:

- MicroChem S1805, S1813 and S1818 positive resist.
- A total of 36 4" Si wafers

## Equipment:

- ReynoldsTech Spinner
- Torrey Pines Scientific Hotplate
- Filemetrics F50

## Protocol:

### Coat

1. Mount wafer and ensure that it is centered.
2. Deposit approximately 7 milliliters of S1800 series photoresist in the center of the wafer.
3. Spin wafer at 500 RPM for 60 seconds.
4. Repeat Step 3 at 500 RPM intervals up to 6000 RPM with a fresh wafer.

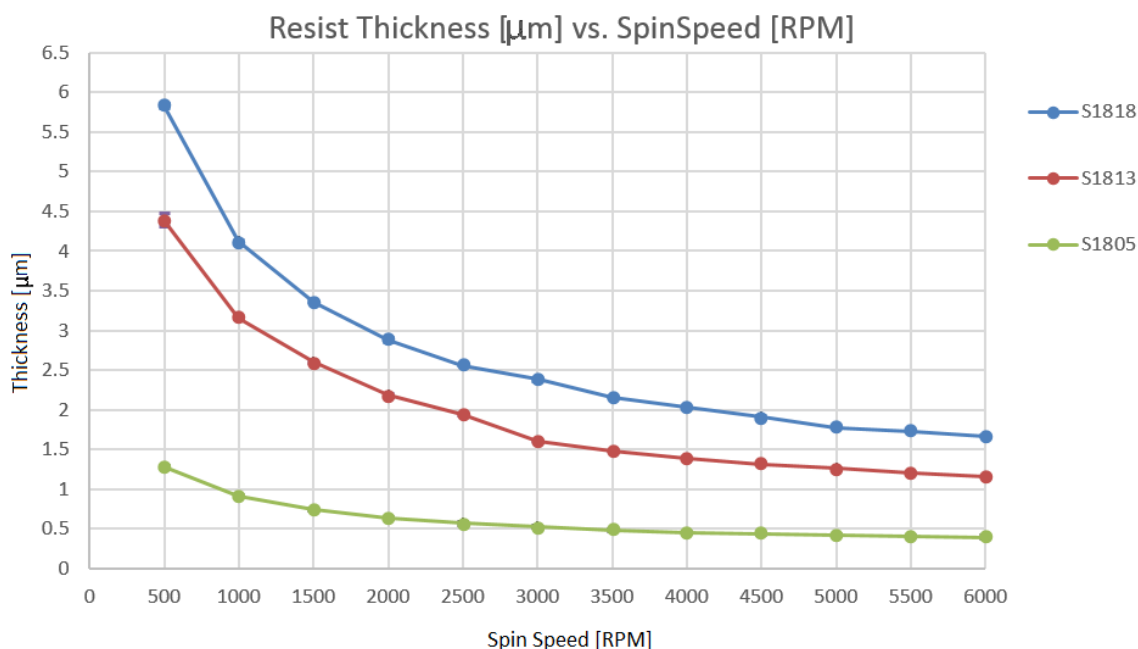
### Soft Bake

1. Bake wafer at 115 °C for 60 seconds and allow wafer to cool after removal.

### Measurement

1. Allow the Filmetrics F50 light to warm up for at least 5 minutes.
2. Click *Baseline...* to calibrate the tool using the SiO<sub>2</sub> and Si standards.
3. Mount wafer and select the *S1800 on Si* recipe.
4. Edit the recipe so that 85 points are measured on the wafer with a 1 cm edge exclusion.
5. Click *Start* to measure the resist thickness of each wafer.

## Results:



Spin Speed [RPM]	Thickness [μm] for S1805				
	Mean	Minimum	Maximum	Standard Deviation	Standard Error
500	1.287	1.226	1.508	0.023	0.002
1000	0.914	0.873	0.943	0.015	0.002
1500	0.742	0.710	0.802	0.014	0.002
2000	0.644	0.620	0.665	0.010	0.001
2500	0.569	0.549	0.584	0.009	0.001
3000	0.524	0.502	0.594	0.012	0.001
3500	0.490	0.464	0.510	0.011	0.001
4000	0.459	0.436	0.480	0.012	0.001
4500	0.438	0.419	0.455	0.008	0.001
5000	0.420	0.396	0.432	0.010	0.001
5500	0.409	0.395	0.420	0.006	0.001
6000	0.399	0.283	0.410	0.006	0.001

Spin Speed [RPM]	Thickness [μm] for S1813				
	Mean	Minimum	Maximum	Standard Deviation	Standard Error
500	4.387	0.294	5.971	0.758	0.082
1000	3.161	2.023	3.271	0.133	0.014
1500	2.596	2.504	3.618	0.129	0.014
2000	2.183	1.433	2.318	0.168	0.018
2500	1.937	1.293	1.993	0.074	0.008
3000	1.604	1.547	1.751	0.031	0.003
3500	1.479	1.440	1.697	0.035	0.004
4000	1.389	1.353	1.438	0.019	0.002
4500	1.318	1.280	1.650	0.042	0.004
5000	1.265	1.218	1.648	0.050	0.005
5500	1.203	1.164	1.384	0.031	0.003
6000	1.157	1.120	1.203	0.015	0.002

Spin Speed [RPM]	Thickness [μm] for S1818				
	Mean	Minimum	Maximum	Standard Deviation	Standard Error
500	5.830	3.355	6.000	0.321	0.035
1000	4.121	2.577	4.357	0.191	0.021
1500	3.362	3.225	3.679	0.058	0.006
2000	2.882	1.373	4.627	0.284	0.031
2500	2.558	2.454	2.804	0.046	0.005
3000	2.381	2.273	4.249	0.218	0.024
3500	2.162	2.104	2.257	0.031	0.003
4000	2.032	1.978	2.169	0.037	0.004
4500	1.911	1.241	2.101	0.084	0.009
5000	1.776	1.699	2.131	0.066	0.007
5500	1.735	1.150	2.001	0.081	0.009
6000	1.673	1.631	1.936	0.042	0.004

The wafer map of specified measurements for S1805, S1813 and S1818 photoresist are shown below.

The thickness achieved by spinning the wafers at 5000RPM (nominal speed) is less than expected for S1805 and S1813. The nominal thickness is achieved at lower spin speeds for those two resists.

Fig. 2 shows the F50 measurement for S1805 spun at 5000RPM and as it could be seen the thickness was roughly 0.42 $\mu$ m (nominal thickness of 0.5 $\mu$ m was **not** achieved).

Fig.3 shows the F50 measurement for S1805 spun at 3500RPM which gives the nominal thickness of 0.5 $\mu$ m.

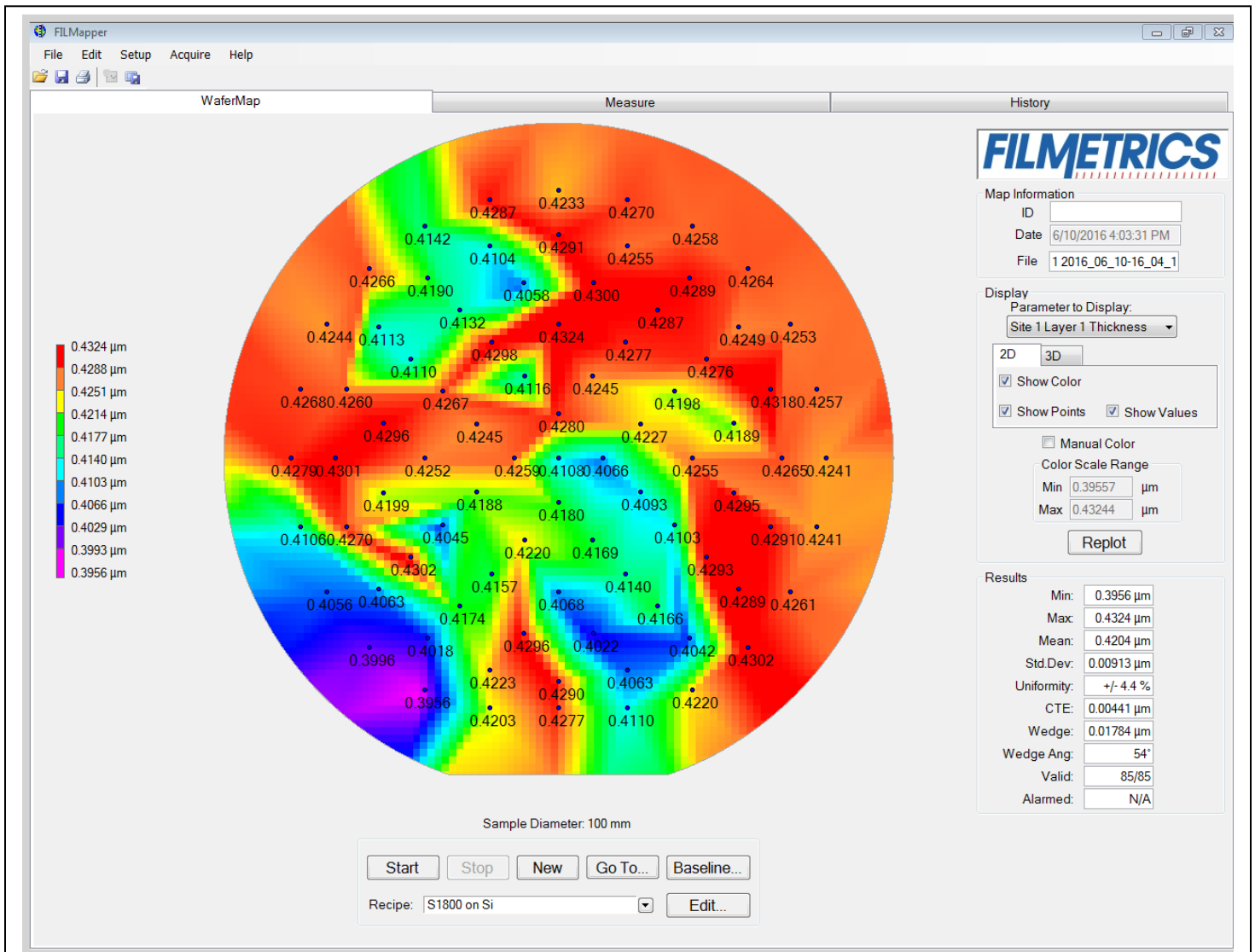


Fig.2 – Results from F50 measurements for S1805 spun at 5000RPM

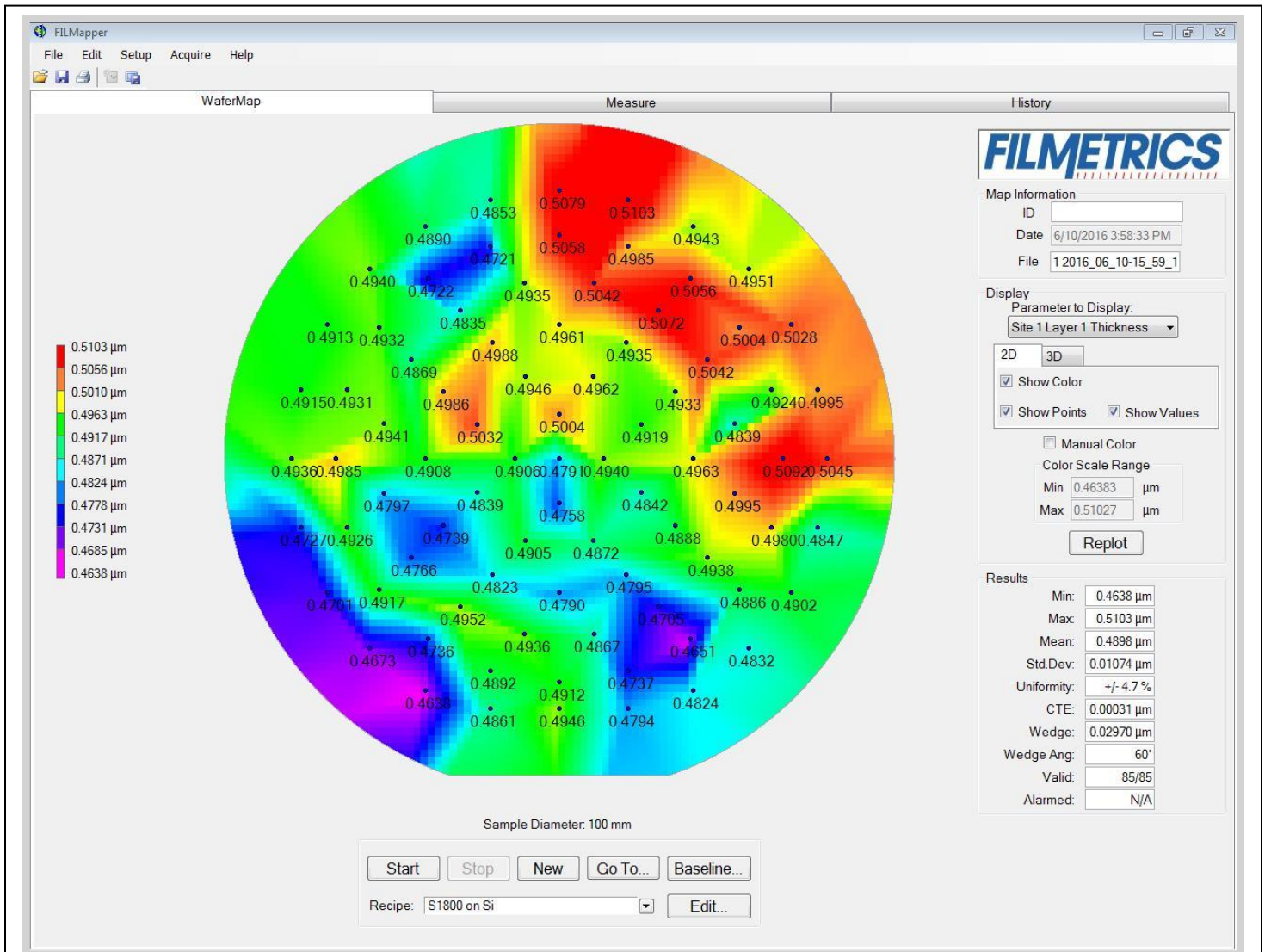
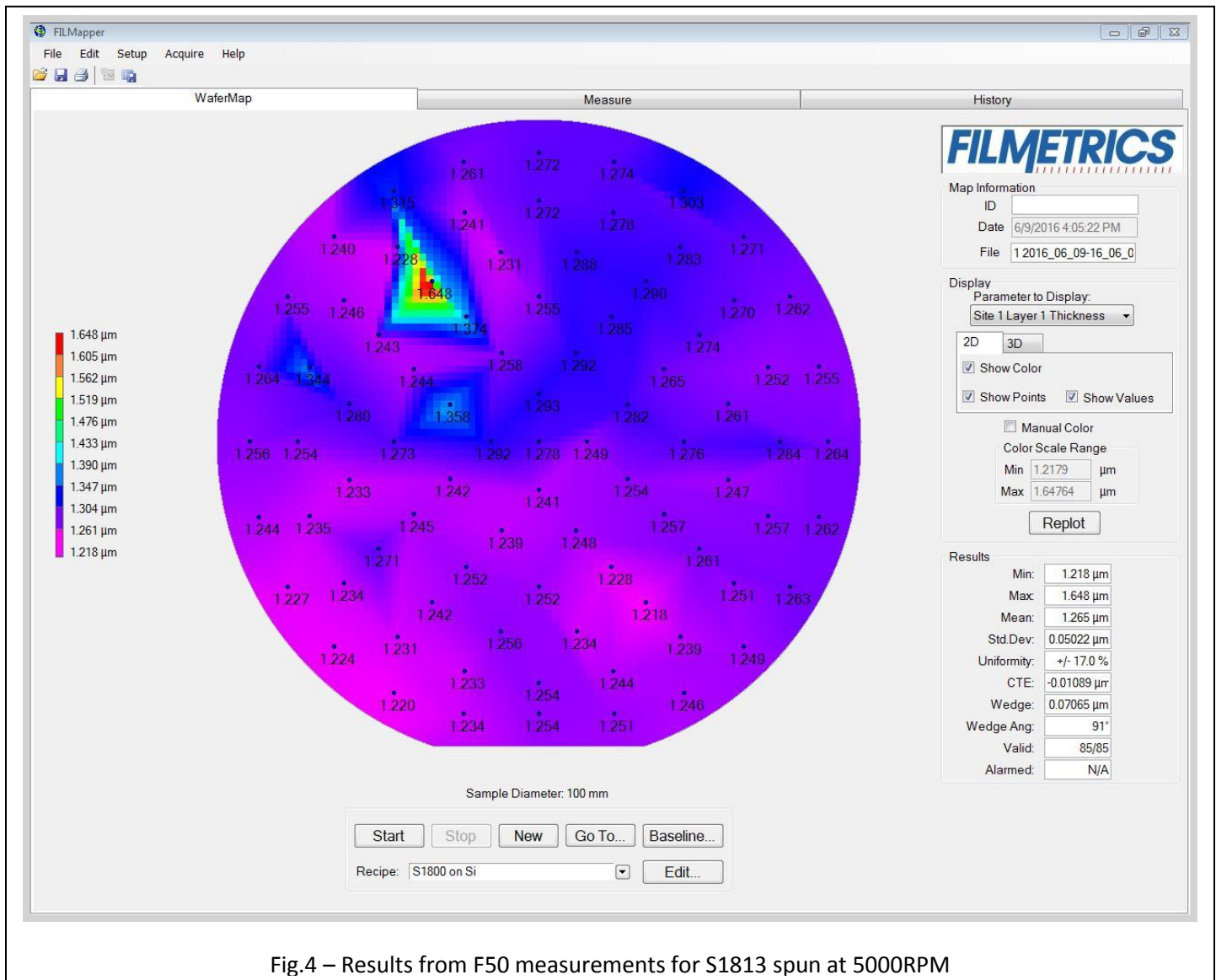


Fig.3 – Results from F50 measurements for S1805 spun at 3500RPM

Fig. 4 shows the F50 measurement for S1813 spun at 5000RPM which gives the thickness of 1.26 $\mu$ m (nominal thickness of 1.3 $\mu$ m was **not** achieved).

Fig. 5 shows the F50 measurement for S1813 spun at 4500RPM which gives the nominal thickness of 1.3 $\mu$ m.





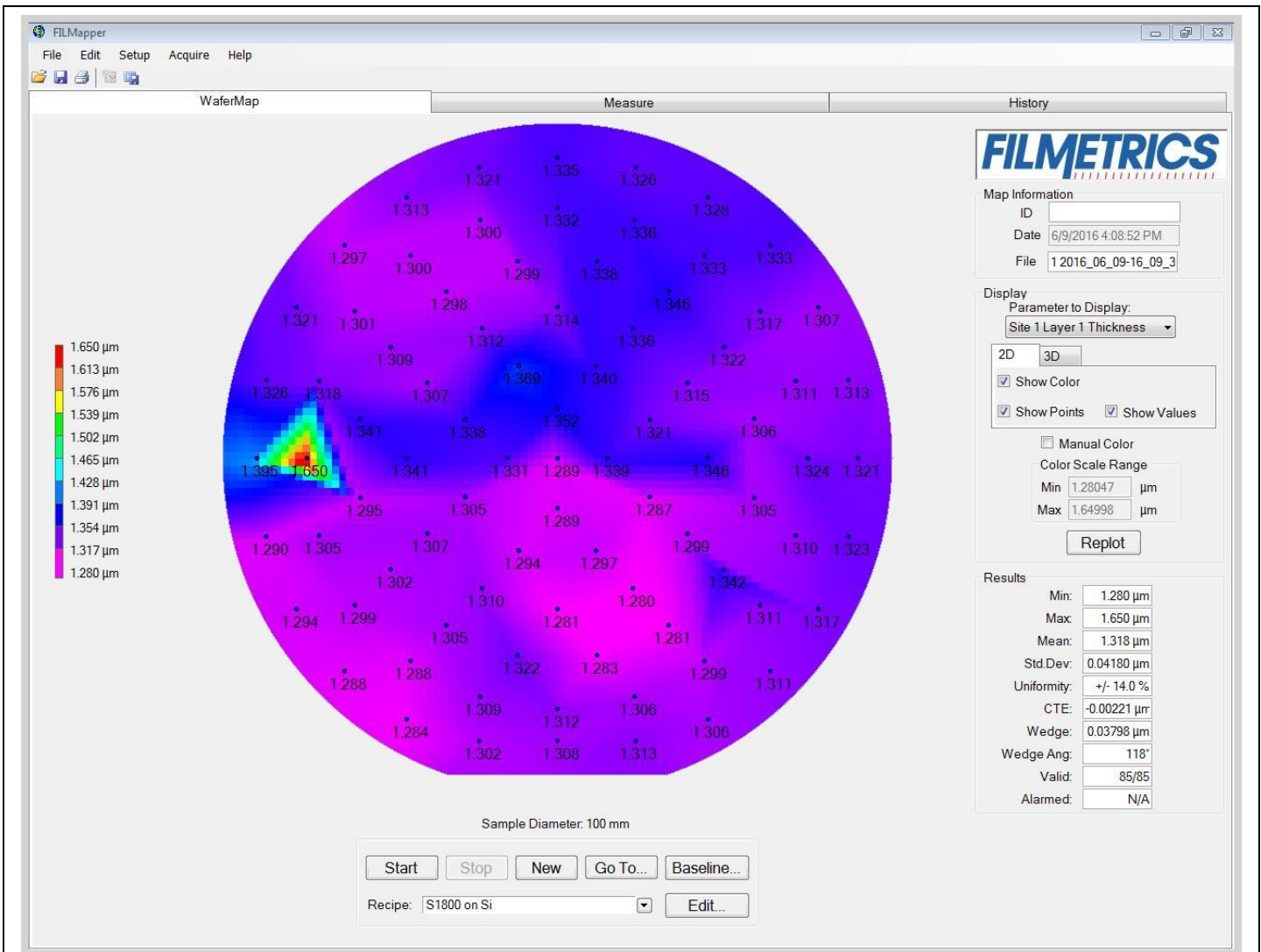


Fig.5 – Results from F50 measurements for S1813 spun at 4500RPM

Fig. 6 shows the F50 measurement for S1818 spun at 5000RPM (nominal thickness of 1.8 $\mu$ m was achieved)

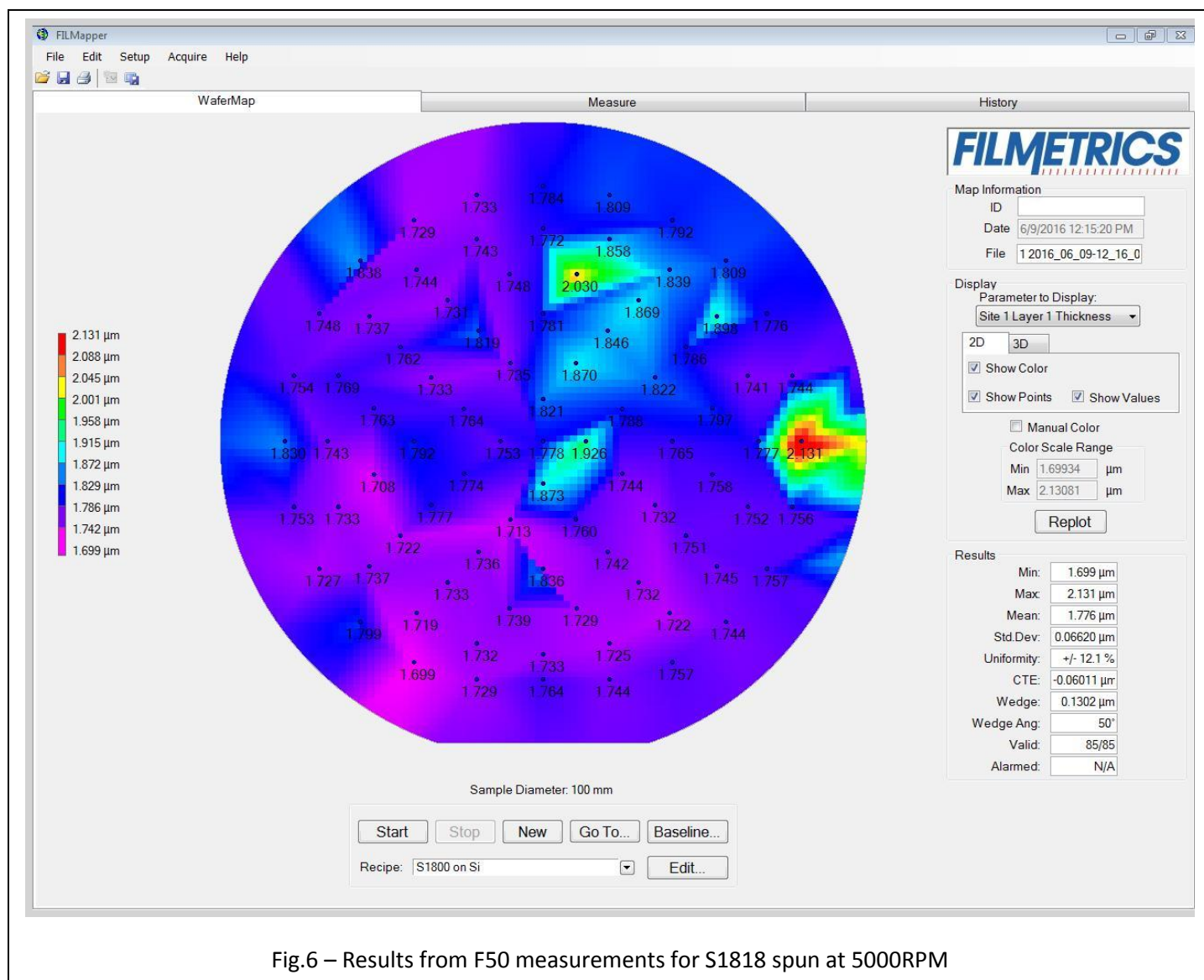


Fig.6 – Results from F50 measurements for S1818 spun at 5000RPM